

REMARKS

The Applicants appreciate the Examiner's careful examination of this case. Reconsideration and re-examination are respectfully requested in view of the instant remarks.

With regard to page 1 of the Office Action, the Applicants were obliged to the Examiner for indicating that all copies of the certified copies of the Priority Documents have been received.

With regard to the first paragraph on page 2 of the Office Action, copies of the foreign documents and non-patent publications listed on the Information Disclosure Statement previously submitted, are enclosed herewith.

With regard to the last half of page 2 of the Office Action and the top of page 3 of the Office Action, it is noted that claim 1 has been rejected as being anticipated by Gilbert (US 6,373,349). In response to this objection, the Applicants have proposed an amended claim1 which is a combination of claims 1, 2 and 3 as last examined plus extra features.

We note that Gilbert claims:

1. A diplexer for coupling transmission signals to and from a signal transmission line, comprising:

a common, slot-line transmission line adapted to carry electromagnetic signals;

a pair of separate slot-line transmission lines coupled to the common transmission line;

each separate slot-line transmission line having an individual filter coupled thereto, wherein each filter is adapted to selectively give its respective separate slot-line transmission line a characteristic impedance dependent upon predetermined frequencies of the electromagnetic signal; and

a separate slot-line balun associated with each separate slot-line transmission line and adapted for coupling signals to and/or from its respective separate slot-line transmission line.

It is noted from the above that Gilbert makes his first claim specific to "slot-line transmission lines". It is noted that Gilbert makes no claims or reference to other forms or types of transmission line (e.g. electromagnetic band gap lines or parallel plate waveguide as described by the present Applicants).

Further in claims 2 and 3, Gilbert goes on to state:

2. The diplexer of claim 1, wherein each individual filter includes one or more tunable resonant slot-line cavities.

3. The diplexer of claim 2, wherein the resonant slot-line cavities are individually tunable by one or more separate switches at predetermined locations along the resonant slot-line cavities and selectively connectable across the respective cavities to determine the electrical length of the respective cavities.

From the above, it is noted that the switches in Gilbert are specifically connected across cavities in the slot-line transmission lines (i.e. Gilbert uses conventional MEMs switches, which essentially have two states, conducting – short circuit – and non-conducting – open circuit) and are not in the ground plane of the micro-strip line to form an electromagnetic band gap structure, as claimed by the present Applicants. It is not correct for the Examiner to state that Gilbert is describing a parallel plate waveguide when Gilbert is specifically describing slot-line transmission lines with tunable slot-line cavities. In a slot-line transmission line, the EM wave is established between the sides of the slot-line and, as such, is highly constrained and essentially a single “plane” or “plate” effect, whereas in a parallel plate waveguide, the electromagnetic wave is constrained to the volume between the plates.

It is emphasised that the electromagnetic switch claimed by the present Applicants is not in the conducting path of the transmission line (e.g. a PIN diode or MEMS device in or across the slot-line transmission line). In the case of the electromagnetic band gap structure, the switch is actually in the ground plane. In the case of the parallel plate structure, the device is in (i.e. through the thickness of) the dielectric within the waveguide, and not in its two walls. It is further noted and emphasised that in the case of the parallel plate waveguide, the electromagnetic signal is not constrained to propagate in one dimension (i.e. back and forth along the transmission line) but is free to propagate in two dimensions (i.e. in both X and Y). This is very different to the Gilbert disclosure.

For the above reasons, claim 1 is believed to be novel and inventive over Gilbert.

On page 3 of the Office Action, the Examiner indicated that claims 2 and 3 were to be found in Gilbert. Claims 2 and 3 have been deleted.

On page 3 of the Office Action, the Examiner indicated that claim 4 is to be found in Gilbert. The Applicants rely for patentability of claim 4 on the fact that claim 4 includes all of the features of claim 1, and claim 1 is believed to be allowable for the above mentioned reasons. In addition, it is noted that Gilbert makes only passing reference to silicon wafers and micro-machinable thin membranes. This is probably due to the electromagnetic signal within the slot-line existing mainly between the sides of the slot-lines and ideally not within the supporting substrate (i.e. the silicon wafer), which should not be acting as a waveguide. To be precise, the silicon in Gilbert is not the guiding medium, and it is primarily there as the substrate on which to support the slot-line transmission line.

On page 3 of the Office Action, the Examiner has indicated that claim 5 is also to be found in Gilbert. The Applicants rely for the patentability of claim 5 on the fact that claim 5 includes all of the features of claim 1, which claim 1 is believed to be allowable for the above mentioned reasons. In addition, claim 5 has been amended to make it more restrictive.

On page 3 of the Office Action, the Examiner has indicated that claim 7 is to be found in Gilbert. The Applicants rely for the patentability of claim 7 on the fact

that this claim includes all of the features of claim 1, which claim 1 is believed to be allowable for the above stated reasons. In addition, claim 1 has been further restricted to specify the presence of at least one element of controllable permittivity that may be used to affect the two-dimensional spatial distribution of the electromagnetic energy by absorption of energy. Gilbert is silent regarding the ability to influence the two-dimensional distribution of power between parallel plates.

On page 4 of the Office Action, the Examiner has indicated that claim 8 is to be found in Gilbert. The Applicants rely for patentability of claim 8 on the fact that claim 8 includes all of the features of claim 1, which claim 1 is believed to be allowable for the above stated reasons. In addition, claim 1 has been amended to specify that the electromagnetic switch elements have complex permittivities which are controllable through associated logic devices.

On page 4 of the Office Action, the Examiner has indicated that claim 9 is to be found in Gilbert. The Applicants rely for patentability of claim 9 on the fact that this claim includes all of the features of claim 1, which claim 1 is believed to be allowable for the above stated reasons.

On page 4 of the Office Action, the Examiner has rejected claim 6 as unpatentable over Gilbert in view of Feng et al (US 6,143,997). The Applicants rely for the patentability of claim 6 on the fact that this claim includes all of the features of claim 1, which claim 1 is believed to be allowable for the above stated reasons. In addition, claim 1 has been restricted to specify that the polymers,

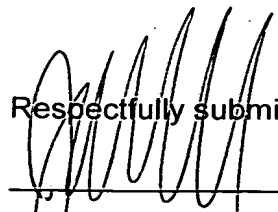
powders or liquid suspensions are of complex permittivities for achieving selectable transmission, reflection and absorption. Whilst Gilbert's MEMS switches can be replaced by those of Feng et al, it is not obvious that dielectric material of different selectable complex permittivity can be displaced as claimed by the present Applicants.

On page 5 of the Office Action, the Examiner has rejected claim 10 as being unpatentable over Gilbert in view of Buck et al (US 5,268,696). The Applicants rely for the patentability of claim 10 on the fact that claim 10 includes all of the features of claim 1, which claim 1 is believed to be allowable for the above stated reasons. In addition, it is agreed that Buck et al discloses a variation of Gilbert's electromagnetic switch in the context of a phase delay line. However, the Applicant's amended claim 1 is believed to be clear of the Gilbert and Buck disclosures which clearly relate to slot-line transmission line devices.

Accordingly, it is respectfully submitted that this application is in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this **RESPONSE** is found to be **INCOMPLETE**, or if at any time it appears that a **TELEPHONE CONFERENCE** with Counsel would help advance prosecution, please telephone the undersigned or one of his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,



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